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SELF-SUFFICIENCY TRENDS IN CANADIAN AGRICULTURE: 1960-1980 AND FUTURE PROSPECTS

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1.0 Introduction

The ability of a country to provide domestically for the nutritional needs of its population has long been a measure of agricultural success. In some countries today, agricultural policies are in fact geared explicitly towards attaining complete self-sufficiency in food products. While Canada does not follow an explicit policy of autarky, monitoring trends in self-sufficiency nonetheless provide an interesting light in which to examine recent history of Canadian agriculture. Domestic policies, geographic and climatic conditions play a large role in determining the self-sufficiency levels of an industry. However, world market and trade conditions, as well as technological developments in production and processing, also contribute to the self-sufficiency trends an industry exhibits. In sum, self-sufficiency ratios depend on many factors, such as: domestic consumption and production patterns, international trade flows, technological developments and agricultural and social policies in both the home country and all other countries.

In the case of Canada self-sufficiency is not an explicit goal but the examination of these trends of production, consumption and trade are useful for evaluating the economic efficiency of an industry. Canada generally exports those products where it has a comparative advantage and imports otherwise. In this way Canada tries to maximize the efficient use of land, and other inputs in the production of agricultural products.

It is the intent of this paper to provide a view of trends in Canadian self-sufficiency, commodity by commodity, over the twenty-year period of 1960 to 1980. Before proceeding with the commodity analysis, however, it is useful to outline the relevant domestic policy issues which may have exerted influence over past self-sufficiency attainments.

1.1 Policy Overview

Among other broad objectives such as stable and fair farm income, reduced economic disparities, and high quality foods, etc., agricultural policies in Canada are aimed at providing adequate and dependable supplies of food at reasonable consumer prices. In this context, Canada achieves self-sufficiency in many products by producing competitively those commodities which yield the greatest return to farmers, processors, etc. As a country, and industry, dependent upon trade, the Canadian agricultural industry has had to expand and grow in those areas where a competitive advantage was evident. Policy makers, past and present, have encouraged the development of those sectors where Canada is internationally competitive.

Markets for many Canadian products depend on both domestic consumption and international trade. Natural resource endowments together with government policies explain the structure of Canadian agricultural exports and imports. Canada's agricultural trade policy varies somewhat among commodities, reflecting particular domestic agricultural objectives associated with each commodity. While not exhaustive, the following list provides a general overview of policies which may have influenced self-sufficiency levels in Canada.

i) Export Expansion

Despite some climatic constraints, the production capacity of the agricultural sector far exceeds the needs of the domestic market. Canada has boasted an agricultural trade surplus in every year but 1969. This is largely attributable to the export of grains. The traditional focus of domestic policy is the expansion of production and markets for the range of commodities for which Canada has a comparative advantage. Through the pursuit of competitive marketing strategies for such products, it is felt that Canada is in a position to take advantage of the growing world demand for food.

ii) Reliance on Imports

There are several products for which Canada is reliant on imports from other countries. A cool climate with a short growing season prevents the Canadian agricultural sector from producing various citrus fruits, tropical and off season fruits and vegetables. There are also other foods which are produced domestically but not in sufficient quantities so as to meet domestic needs. In such cases, where self-sufficiency ratios are low, imports are required to provide adequate supplies at reasonable prices.

iii) Import Replacement

While agricultural production in Canada is not aimed explicitly at replacing imports on a broad scale, there are certain products for which capturing an increased share of the domestic market is a viable market alternative. With approximately two-thirds of Canada's agricultural imports consisting of products which are also produced domestically, there is much scope for increasing domestic production on a competitive basis and reducing Canada's dependency on foreign imports. The development of Canadian alternatives to products currently imported, (e.g. apple juice to replace orange juice) together with domestic promotion via 'Buy Canadian' advertisements, and the advancements in storage facilities (e.g. apples, storable vegetables) and plant breeding programs (e.g. canola) reflect efforts geared towards increasing the share of Canadian food requirements met from domestic sources.

iv) Import Regulations

Supply management marketing boards have been established in the dairy and poultry sectors for purposes of regulating supplies. Through targeting production levels to meet anticipated domestic needs, it is hoped that such policies will introduce stability into prices and producer incomes. GATT permits the use of import controls in instances of supply management, but these controls must respect traditional import levels and suppliers. Supply management is considered to be an explicit policy of full or nearly-full domestic self-sufficiency.

Import restrictions also exist in the beef and grain sectors. Introduction of the Meat Import Law in February 1982 allows the Minister of Agriculture to implement import quotas if imports of beef and veal reach certain pre-negotiated and set trigger levels. In the case of grains, the Canadian Wheat Board has the authority to issue import permits for all commodities under the jurisdiction of the Board.

Tariffs and non-tariff barriers such as health and sanitary regulations which are a part of Canada's trade policy also have some influence on self-sufficiency levels. In the instance of tariffs, the structure of all countries' tariff schedules (including Canada's) is such that processed products are protected more than the raw product.

2. Commodity Analysis

This section provides an historial account of self-sufficiency trends for various commodities, based on annual levels of production and consumption over 20 years. To the extent that

stocks or inventories are omitted from the analysis, it must be acknowledged that a small upward or downward bias may on occasion exist in the results. The study will however, provide insight into the long range trends in various agricultural sectors. The discussion will focus in turn on the grains, oilseeds, fruits, vegetables, meats and dairy sectors.

For the purposes of this paper, self-sufficiency has, wherever possible, been calculated by expressing production as a percentage of domestic consumption or use. One hundred percent represents full self-sufficiency while less than 100 would indicate that imports are required to meet domestic consumption levels. It is possible for a commodity to increase its self-sufficiency ratio from 110 percent to 120. In most cases this would indicate that exports are increasing. It was necessary in some cases to aggregate commodities to form joint products (e.g. oil and meal in oilseed) or in others to omit certain forms of a product because of insufficient disaggregation (e.g. processed meat products). Because of these adjustments, this study contributes more to the analysis of general trends over time rather than absolute yearly comparisons.

2.1 Grains

Canada's grain market is worldwide, with an average of 50 percent of its production having been exported over the last fifteen years (Table 1, Figures 1-5). In the past Canada has shared its grain market with the United States, Australia, Argentina, South Africa etc. and more recently the European Economic Community (EEC). Markets have changed over the last 20 years and while market growth once came largely from industrialized countries, it now comes mainly from the USSR, China, Eastern Europe, the middle income and developing countries. Fluctuations in world production and the fact that trade which is a small percent of production, is to a large extent, influenced by the policies of

other countries helps explain the patterns and volumes of trade flows in grains. Exports are also influenced by the relative prices of other grains, national and world grain stocks, and the lastly, commercial debt of importing countries.

Canada's wheat production greatly exceeds domestic needs (Figure 1). On average, three out of every four tonnes produced since 1961 have been exported. Stocks on average, have represented 8.3 percent of production over this same period. Large stock accumulations have typically arisen at times of depressed world import demand, while a one time production cutback associated with plans to lower inventories (LIFT) explain the decline in wheat stocks and self sufficiency in 1970-71. Other event such as droughts, transportation and handling problems also account for the variability displayed.

Trends in the ratios for wheat have depended on Canadian production, world production, world prices and market conditions. Over the last two decades the Soviet Union and the People's Republic of China have been Canada's principal customers, receiving roughly one-third of the Canadian wheat exported. Canadian shipments to these two countries have fluctuated greatly over the last ten years, due largely to variations in Soviet production levels and competition from other wheat exporters in the Chinese market. Japan is another important market for Canadian wheat. Despite having increased exports to Japan slightly over the last decade, Canada's market share to this country has declined. The loss may be attributed to the replacement of Canadian shipments by American wheat. Although the United Kingdom used to be a major market for Canadian wheat, that country, since joining the European Economic Community, has reduced its imports of wheat and flour significantly.

Although Canada has traditionally been a supplier of high quality, high protein wheats, there has been a increasing interest in high yielding medium protein wheats. Growing markets for these

wheats are evident in many areas of the world, notably the Middle East, and Asia. Canada has recently (1984) taken advantage of this market growth by licencing a variety known as HY 340 which meets the specifications of these markets.

Canada has long been self-sufficient in rye (Figure 2). As one of the world's leading exporters of rye, Canada markets one-half of its crop abroad. The relative share of rye with respect to total domestic grain production remains quite low however. Japan represents the main market for Canadian rye, receiving over 65 percent of total rye exports.

The Canadian feed grain market trades in barley, oats, feed wheat and corn. Production of Canada's main feed grain, barley exceeds domestic requirements (Figure 3). Canada has, on average, exported 29 percent of its output over the last twenty years. Japan, the Soviet Union, Italy and Poland represent Canada's major markets over the last decade. In Japan, Canadian barley competes with Australian barley and American corn. French barley provides stiff competition for Canadian exporters in markets of Western Europe, the Soviet Union and Poland. Both production and export levels of barley expanded significantly over the last two decades accounting for the increasing self-sufficiency ratios.

The production and consumption of oats in Canada has fallen over the last twenty years (Figure 4). Superior market prospects and profitability offered by other grains account for much of this decline. Self-sufficiency ratios presented in Table 1 tend to underestimate the degree to which Canada has been able to meet domestic needs. Once stock adjustments are fully accounted for, it is clear that Canada has been completely self-sufficient in oats. Imports were required in three of the twenty years and these were only very small quantities. These imports consisted primarily of milling oats when Canadian supplies, probably because of weather, did not meet the quality standards for milling.

Both the domestic production and consumption of corn have increased steadily since 1960, with particularly large upward movements in the last five years (Figure 5). Self-sufficiency ratios have also risen steadily, reaching 123 percent in 1981. Imports fluctuated over the last two decades, reaching peak levels in the mid-seventies. Since 1981, Canada has become a net exporter of corn. Research efforts in the development of new varieties of corn and expanded domestic growing areas enabled larger domestic supplies and reduced dependence on imports.

In summary, the self-sufficiency ratios for wheat, rye and barley have always greatly exceeded the levels required for domestic consumption. For oats this trend is true in most years although occasionally, imports have been required. Impressive gains in the self-sufficiency ratios for corn were experienced over the last two decades until in 1981 Canada became a net exporter of corn.

The impressively high self-sufficiency ratios which characterize the Canadian grain market are expected to continue in the future. Total grain production is forecast to increase steadily throughout the next two decades. Expanding exports of high quality grain, of either high or medium protein levels, will continue to form the basis for Canadian agricultural exports in the future.

2.2 Oilseeds

Canada's major domestically produced oilseeds are canola (rapeseed), soybeans, sunflower and flaxseed, all of which yield fats, oils and meal. Oils derived from canola, soybean and sunflowers are used for human consumption while linseed oil, which is produced from flax, is an industrial oil. When rapeseed was first grown in Canada it too was considered an industrial oil. Genetic improvements that have lowered the erucic acid levels have made certain new varieties of rapeseed (canola distinguished by the new name) acceptable for human consumption. Increased acreages and production of soybeans have also risen because of genetic improvements. (Table 2 and Figures 6-9).

Protein-rich oilseed meal is used as a component in livestock feed. The utilization of meal depends on grain prices relative to oilseed prices and the demand for livestock products.

Oilseed production in Canada varies according to the profitability of grain production, inventories, world price expectations and climate. Of the four oilseeds, canola and soybeans dominate domestic consumption.

Canola is grown largely for its oil, as it has an extraction rate of 40 percent, and crushers use the oils to manufacture vegetable oils, fats and margarine. Recent trends toward the substitution of margarine for butter have contributed to the observed upward trend in canola oil utilization. Indicative of its successful development program canola oil increased its share of the Canadian deodorized vegetable oil market from 29 percent in 1976 to 40 percent in 1978.

Observed fluctuations in the self-sufficiency ratios for canola can be explained largely with reference to variations in production levels (Figure 6). From 1963 to 1972, impressive gains in production were realized, owing largely to demand-related factors. With the development of varieties free of erucic acid, Canadian canola became increasingly competitive in foreign markets during the seventies. The period between 1972 and 1977 was characterized by variable output as radical price fluctuations induced wide variation in acreage devoted to canola plantings. Adverse weather conditions which exerted large impacts on yields, also contributed to this variability. The expansion of canola production between 1977 and 1979 can be attributed largely to favourable prices at the time of seeding, relatively large barley stocks and demand from processors for larger canola supplies. Persitent high levels of stocks, the

resumption of canola production in Western Europe and a fall in world prices explain the reduction in area planted and the consequent observed decline in canola production beginning in 1979.

In the case of soybeans, extraction (18-19%) rates are such that the meal is more valuable than the oil. Soybean meal accounts for approximately 60 percent of the total value of the raw bean. Soybeans now account for approximately 34 percent of the Canadian deodorized vegetable oil market and domestic utilization has risen fairly steadily over the last 20 years. Domestic consumption of soybean oil has fallen behind canola oil since 1976.

Soybean production began an impressive upward trend in the seventies. During the sixties the self sufficiency ratio averaged about 37 percent. The first half of the seventies expanded production helped self sufficiency ratios each 50 percent. The favourable ratio between Ontario soybean prices and corn prices contributed to the 68 percent self-sufficiency ratio experienced over the last five years. Despite admirable increases in self-sufficiency over the last two decades, Canada remains a net importer of soybeans (Figure 7). Almost all of the crop is consumed domestically, while imports from the United States are still required to meet demand. On-going research has focused on the development of new varieties of soybeans which are more adaptable to Canadian conditions. Expansion of the growing area for soybeans has already enabled domestic production to replace, in part, those shipments previously imported. If continued, this emphasis on import replacement will likely be reflected in substantially higher self-sufficiency ratios for Canadian soybeans in the future.

2.3 Fruits and Vegetables

i) Fruits

Fresh fruit accounts for 65 percent of total fruit consumption in Canada. The increase in domestic fresh fruit production was not sufficient to meet the even faster growing demand over the last twenty years, and Canada's self-sufficiency in fresh fruit has declined (Table 3, Figure 10). To meet its fruit needs, Canada relies on imports, primarily from the United States, Central and South America and South Africa.

Apples account for 28 percent of total fruit consumption and represents 65 percent of total fruit production in Canada. In the years 1960 through 1973, Canada was completely self-sufficient and a net exporter of apples (Figure 11). Production increases were due largely to greater acreage and the development of new varieties rather than productivity gains. Despite increases in apple production, Canada has since become a net importer of apples. A growth in demand for fresh apples in the off season (e.g. Granny Smith), varieties produced primarily in France and South Africa, has accounted for much of the rise in import levels.

Grapes, peaches and strawberries are other fruits which represent major crops in Canadian fruit production. Self-sufficiency for grapes has remained fairly stable, fluctuating between 33 and 42 percent over the twenty year period (Figure 12). Peaches (Figure 13) and strawberries have also shown fairly stable ratios, fluctuating around 70 and 60 percent, respectively. Ratios for plums and prunes have fallen steadily from 60 percent in 1960 to below 20 percent in 1981. Self-sufficiency in cherries has also declined, falling from 97 percent to 64 percent in 1981 (Figure 14).

Self-sufficiency ratios in the processed fruits sector, which depend on fruit production in general, has declined for canned goods and improved for frozen goods (Table 4, Figures 15-19). Apples occupy an important place in the processing market. For some varieties, production generally exceeds Canadian needs, enabling processed surpluses to be exported. Apples are processed mainly into juice and concentrate (Figure 15). Marked increases in juice consumption were reflected in the impressive growth of apple sales since 1975. Apples are also processed in the form of pie fillings, pulp and apple sauce.

Other fruits processed in Canada are typically canned or frozen. The demand for canned fruit declined in the seventies as consumers preference switched to fresh produce. Furthermore, the syrup in which the fruit is canned was considered too sweet by increasingly health-conscious consumers. The decline in demand for canned pears and peaches was also attributed to stiff competition from South Africa, the United States, Australia and China (Figures 16-17). Production has consequently fallen by about 75 percent since 1960, reducing self-sufficiency ratios to 29 percent in 1981.

During the sixties and early seventies frozen fruits did not generally receive a favourable response from consumers (Figure 18). As a result of weak prices, production fell off considerably for some products. For instance, as Canadian strawberry production declined and consumption remained fairly stable, Canada increasingly imported frozen strawberries, mainly from Poland. With advancements in fast freezing technologies there has been some turn around in the self-sufficiency ratios for strawberries (Figure 19). Production rose again in the latter half of the seventies and early eighties. The production and export of frozen blueberries has also risen in recent years and there appear to be good prospects for further exports in the future.

For some products the technical potential for import replacement appears significant. While Canada currently depends heavily on imports, there is scope for increasing domestic self-sufficiency on a competitive basis in some areas. Reducing Canadian dependency on imports of such fruits as apples, pears, grapes, fresh and canned peaches is a realistic goal. Over 20 percent of fresh apples consumed in Canada are currently imported. The development of a Canadian variety of apple which could successfully replace the Granny Smith would contribute greatly toward decreasing the dependence on imports. Frozen blueberries are an example of a frozen fruit which has enjoyed strong demand. In addition it is considered that a substantial export market exists for this fruit, particularly in Japan and West Germany.

ii) Vegetables

Canadian fresh vegetables represent 56 percent of total domestic consumption of all vegetables. Both production and consumption have increased steadily since 1970, and the overall self-sufficiency ratio has fluctuated around 70 percent (Table 5, Figure 20). Self-sufficiency ratios for individual vegetables are closely related to the feasible storage period. Canada is self-sufficient in several storable vegetables in most years. Carrots, turnips, beets and potatoes, for instance, are usually produced in sufficient quantities to meet annual domestic needs (Figures 21-22). Other vegetables are close to self-sufficiency levels such as beans, cabbages, cauliflower and corn (Figures 23-24). A potential exists to supply all of Canada's needs for these products and for some other items which have historically had lower self-sufficiency levels, such as radishes and onions (Figure 25). Substantial quantities of tomatoes (Figure 26), lettuce (Figure 27), celery and cucumbers are imported every year.

On average, the U.S. supplies about 70 percent of Canadian imports of fresh vegetables (excluding potatoes). Mexico is the second largest supplier of fresh vegetables and tomatoes, cucumbers and peppers are the largest bill items. Fresh vegetables not grown in Canada are imported duty free. However, those vegetables grown in Canada are protected by seasonal tariffs during the Canadian growing season.

Canada's main canning vegetables are peas, beans, corn and carrots. Consumption declined somewhat over the last two decades as improvements in transportation and storage facilities have enhanced the availability and quality and consequently the demand for fresh produce. With the exception of carrots, Canada has been a net exporter of canned vegetables over the last twenty years (Table 6, Figures 29-30). The processing sector does, however, compete with a fairly large volume of imports. Imports of canned beans, carrots, corn, tomato juice, tomatoes and tomato paste are the main items which compete directly with Canadian products.

The consumption of frozen vegetables increased steadily from 1960 until 1974, then declined in the mid-seventies (Table 7,). Since then, the frozen vegetable sector has experienced some expansion. The production of frozen vegetables such as sweet corn, peas, beans and carrots is becoming increasingly important as the quality of the product has improved enormously. Frozen peas, (Figure 31) beans and carrots compete with imports, particularly from the United States. Canada exports a relatively small volume of its production, chiefly to the United States, United Kingdom, Japan and Venezuela.

There is scope for increasing Canadian self-sufficiency in the vegetable sector through both the replacement of fresh imports with Canadian frozen produce and by extending the availability period for fresh Canadian vegetables. Improved storage facilities, greenhouse production and the development of improved product varieties are methods through which domestically produced vegetables could be made available over longer periods. Substantial progress has already been made in this respect. The development of a vacuum-cooling apparatus has enabled the extension of the lettuce season beyond fourteen weeks. Implemented in 1973, the Fruit and Vegetable Storage Construction Financial Assistance Program encourages the building of improved storage facilities for perishables. This program has helped to enable a supply of quality Canadian products to be available for a longer marketing season. Further production improvements such as these would transcribe to higher self-sufficiency ratios in the next decade.

2.4 Meats

The Canadian meat industry is subject to fewer trade restrictions than many agricultural sectors. Demand varies according to the relative prices of each type of meat, population size, consumer incomes and changing tastes. Supply is determined by the relative profitability of production at a given time. In this respect, grain prices and interest rates associated with farm loans play significant roles. Available supplies are also dependent upon the cyclical behavior of animal production. These cycles are reflected in observed changes in herd sizes, which typically oscillate between long build-up phases and generally shorter reduction periods (more so for beef than for pork).

1) Beef

While Canada has generally been a net exporter of live cattle over the last two decades overall, fed or high grade beef production has on average been in balance with domestic consumption. Canada tends to be a net importer of beef used for manufacturing. Two phases can, however, be identified in the Canadian beef market (Table 8, Figure 32).

The first phase, extending from 1960 to 1968, represented a period of complete self-sufficiency in the Canadian beef sector. Domestic production rose steadily, promoted by reasonable grain prices and rising beef prices. The year 1969 marked the beginning of the second phase, as Canada entered a period in which complete self-sufficiency was no longer achieved. Production levels were inadequate to meet the trends toward greater beef consumption which were associated with rising household incomes. With herds in the build-up phase and beef prices not keeping pace with the rising grain prices, domestic beef production was restrained. The second cycle was thus a period in which Canada was a net importer of both high grade and manufacturing beef, relying primarily on shipments from Australia, New Zealand and the United States.

During this second period, Japan, the EEC and the United States were restricting beef imports leaving Canada as one of the few remaining markets accessible to exporters. This and other factors led Canada to legislate the Canadian Meat Import Act, which was introduced in February 1982.

Having reached their lowest levels in 1976, self-sufficiency ratios resumed an upward trend, reaching 99 percent in 1982. Reductions in consumer demand, abnormally high female

slaughter due to poor returns in the industry and relatively large cattle numbers, enabled greater supplies to be available for export.

Canada's trade in live cattle during this twenty year period was characterized by the export of slaughter cattle for the fresh lower quality beef market in the USA, and the import of higher grade slaughter cattle for the hotel and restaurant trade in Canada. During most of this period Canada also exported feeder cattle to the USA. Exports of feeder cattle during the first phase (1960-68) were three or four times the levels exported during the seventies. Increased consumption and the expansion of herds lead to a decline in 1969 which was followed by a rise in exports a few years later due to a very strong US feedlot demand for replacements.

The Canadian beef sector has both the economical and technical potential to increase output over the next two decades. In particular, there are indications that there is some scope for more domestically produced manufacturing beef (a meat typically used by fast-food establishments). However, the viability of reducing Canada's dependence on imports of this type of use awaits further evaluation.

ii) Pork

Canada was self-sufficient in pork for most of the period from 1960 to 1980, as both production and consumption displayed upward trends. Self-sufficiency ratios were lowest in 1976 and 1977, as producers were faced with high grain prices, and generally low hog prices (Table 8, Figure 33).

Since 1977, domestic pork production has recovered significantly. The 60 percent rise in output between 1977 and 1980 was a result of productivity-related improvements in feed efficiency, genetics and capital investment as well as cyclical factors such as herd rebuilding and prices. Canada has since been self-sufficient in pork and has resumed its position as a net exporter, serving primarily the markets of Japan and the United States.

The increases in pork production projected for the next decade would suggest that greater supplies should be available for export. It is thus expected that Canada will become increasingly self-sufficient in pork and be able to extend its status as a net exporter in the pork market.

iii) Lamb and Mutton

The domestic market for lamb is segregated into fresh and frozen products. Fresh lamb, regarded as a gourmet delicacy and a substitute for choice cuts of beef, is not considered to be a substitute for frozen lamb, which competes with the lower priced cuts of beef, pork and poultry. Mutton is meat from older sheep and is most often consumed in processed form, such as sausages.

Canada has never been completely self-sufficient in mutton and lamb (Table 8, Figure 34). From a high of 59 percent in 1960, the total lamb self-sufficiency ratio fell to 24 percent by 1980. The 1980's saw a resumed upward trend in self-sufficiency, attributable to substantially larger domestic supplies and lower consumption levels. Domestic production provided roughly 77 percent of fresh lamb consumption in 1980, while frozen lamb and mutton consumption consisted entirely of imports.

Demand for lamb and mutton in Canada is expected to grow moderately in the next few years. Improved advertising and promotions, combined with assured availability of annual supplies, will serve to promote domestic consumption. The potential for the domestic industry to meet the expected future rise in demand appears promising. Changes in breeding methods, nutrition and management offer possibilities to raise the level of production in the sheep industry. Production has realized marked increases since 1980, with output rising by over 70 percent between 1980 and 1982. Should such progress continue, Canada's self-sufficiency in lamb and mutton will improve considerably in the future.

iv) Poultry

The poultry meat industries have become increasingly regulated over the last decade with the adoption of national marketing plans for turkey (1974) and chicken (1979) and egg (1973). These plans are aimed at securing greater income and market stability for producers. Under the federal-provincial agreements, the national marketing agencies co-ordinate the boards operating in each province. These agencies are supervised in turn by the National Farm Products Marketing Council. The observed self-sufficiency ratios in poultry meat averaged around 100 percent, reflecting the supply-management policies which aim for production levels sufficient to meet domestic needs (Table 9, Figure 35). Controlled imports are sometimes required to meet seasonal demands if domestic supplies are not sufficient. Import permits are issued in these instances and imports have risen somewhat in recent years. Chicken imports are typically highest in the second and third quarters.

Under the GATT, Canada is committed to minimum levels of imports as a condition for the imposition of import controls in support of supply management goals. Minimum access quotas are based on historical average import levels preceding the implementation of the plan. The export of any periodic surpluses which might arise is difficult given the lower prices in international markets. Thus future increases in self-sufficiency ratios for these supply managed products are unlikely.

Domestic poultry consumption depends mainly on income levels and the price of substitutes, such as beef or pork. The drop in the self-sufficiency ratio in 1975 was largely due to rapidly rising consumption. Increased consumer preference for leaner meats has had a favourable impact on the poultry sector. The processing sector has also expanded rapidly, particularly in the area of chicken, with the growth of retail fast food chain outlets for chicken. Domestic production is expected to expand in line with domestic consumption.

2.5 Dairy Products

The milk industry in Canada is divided between two markets: fluid milk for drinking and industrial milk for manufacturing into products such as cheese and butter. These sectors are administered by supply control agencies operating at the federal and provincial levels. Responsibility for the production and sale of fluid milk belongs to the provinces, which allocate quotas and set prices. Canada is self-sufficient in fluid milk (where here includes fresh cream and yogurt) as are most provinces (Table 10). The commercial production of fluid milk by reconstitution from milk powder is prohibited by provincial regulations.

In the area of industrial milk, the federal government co-ordinates and supports production on a national scale. The Milk Supply Management Committee establishes the level of a national production quota (MSQ) and allocates this between the provinces. The Canadian Dairy Commission, a Crown corporation, administers federal dairy policy, including subsidy payments to producers, price support purchases of butter and skim milk powder, and exports of surplus product. Import controls are implemented in support of supply management.

Given this high degree of regulation in both the fluid and manufacturing milk sectors it is not surprising that the self-sufficiency ratio for milk for all purposes has remained relatively stable at around 100 percent. This situation is expected to continue, with total milk production being adjusted to match gradual changes in total milk consumption.

In the case of manufactured dairy products, net self-sufficiency ratios do vary by product and significant trends over time are noticeable in some cases. Skim milk powder (SMP) constitutes the major dairy product export (Figure 36). Its self-sufficiency ratio doubled in the last two decades, reflecting large and growing domestic surpluses. Since world prices are well below domestic prices, exports must be financed by producer levies. Further increases in self-sufficiency ratios are therefore, not expected.

Cheddar cheese is also exported, primarily under quota, to the EEC and the U.S. The imposition of import duties associated with the entry of the United Kingdom into the EEC reduced the export market for Canadian cheddar, but limited access into the EEC was secured in the 1979 Multilateral Trade Negotiations. Substantial surpluses of cheddar have been available for export in the 1980's, although lower than in 1968 when the self-sufficiency ratio peaked at 200 percent (Figure 37).

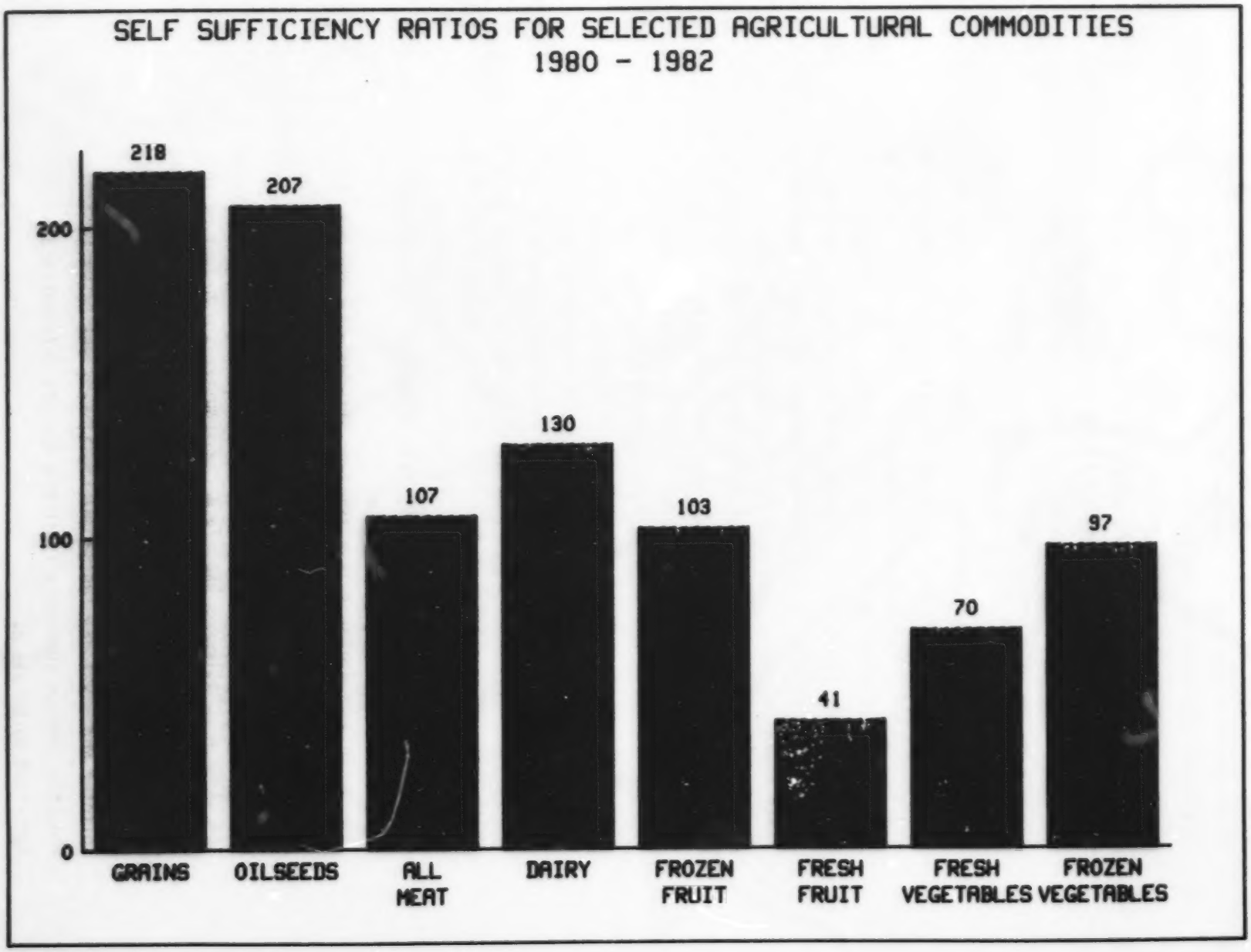
Imports of dairy products are subject to controls under the Export and Import Permits Act. These are necessary to facilitate supply-management. In addition to importing relatively small quantities of butter (Figure 38) and casein, Canada imports specialty cheeses (Figure 39). The principal suppliers of the latter are EEC countries which together provide roughly 60 percent of Canada's cheese imports. Developments in the production of specialty cheeses in Canada have been very successful and although imports continue, self-sufficiency levels have improved from 45 percent in 1960 to 80 percent in 1980. Domestic consumption and production (and the self-sufficiency ratio) of specialty cheeses (taken here to include all non-cheddar cheeses) are expected to continue to rise in the future. Butter self-sufficiency is expected to remain around 100 percent.

3.0 Summary

A summary of self-sufficiency levels that characterized the Canadian agricultural sector in the early 1980's is presented on the following page. Grains and oilseeds clearly surpass other sectors in terms of ability to exceed domestic requirements. Continued emphasis on expanding Canada's exports of grains and and oilseeds and efforts directed at decreasing imports of soybeans and corn shall strengthen domestic self-sufficiency in the grains and oilseeds sectors even further.

Continuing developments in import replacement in the fruit and vegetable sectors should be reflected in gains in self-sufficiency attainments within the next decade. While Canadian production has increased over the last 20 years, it is hoped that improved storage facilities and the development of new varieties will increase the level of self-sufficiency further.

In general, Canada is more than self-sufficient in meat. Efforts focused on improving productivity and displacing imports, when possible, in the pork, beef and sheep meat sectors will help


SELF SUFFICIENCY RATIOS FOR SELECTED AGRICULTURAL COMMODITIES
1980 - 1982
218
207
107
130
103
41
70
97
200
100
0
GRAINS
OILSEEDS
ALL MEAT
DAIRY
FROZEN FRUIT
FRESH FRUIT
FRESH VEGETABLES
FROZEN VEGETABLES

these areas to maintain or improve their self-sufficiency levels in the next few years.

Domestic supplies of skim milk powder and cheddar cheese will continue to exceed domestic needs. Self-sufficiency levels for most other products in the supply managed dairy and poultry sectors can be expected to remain around 100 percent.

To generalize about the Canadian agricultural industry in terms of self-sufficiency is difficult because in aggregate the results are very mixed. About an equal number of products experienced an improvement in their self sufficiency ratios, as declined. Another only slightly smaller number did not change significantly over the 20 year period. These results are not surprising for at least three important reasons: (i) consumption patterns - tastes and preferences changed noticeably during this period, a change which was enhanced in several sectors by technological improvements, but could not be met fully by domestic production (e.g. fresh fruit and vegetable storage, improved freezing technology, etc); (ii) a land base and technology which has traditionally and naturally produced certain varieties and species of agricultural products which sustained not only a domestic population but built a successful export industry (e.g. wheat, oats, flax, potatoes, etc.); (iii) and Canada's free trade policy which generally promotes the notion of production and export of those commodities which have a comparative advantage.

The variability in the self-sufficiency trends also hilights the important concept that it is not self-sufficiency as a goal per se that is important but rather how these trends can help explain production and consumptions levels, returns and profitability and the kinds of challenges that face the industry in the future in the areas of import replacement, export development, domestic and trade policy. Hopefully by analyzing some of the historical trends, insight can be gained and used in the development of policies and new technologies which will help the Canadian industry compete successfully in the dynamic international agri-food marketplace.

ANNEX

TABLE 1: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED GRAINS (Percentages)

CROP YEAR	ALL WHEAT	BARLEY	OATS	RYE	CORN
1961-62	199	91	90		
1962-63	410	139	123		
1963-64	462	152	112	233	61
1964-65	407	105	91	200	77
1965-66	413	127	103	216	71
1966-67	516	145	98	181	75
1967-68	380	119	91	150	69
1968-69	394	140	116	174	72
1969-70	400	135	108	190	71
1970-71	194	141	97	268	88
1971-72	301	177	101	256	95
1972-73	305	154	91	128	75
1973-74	354	144	100	152	70
1974-75	291	142	99	166	69
1975-76	356	146	109	191	91
1976-77	490	168	114	183	87
1977-78	393	190	111	202	98
1978-79	402	152	96	269	89
1979-80	313	118	85	234	89
1980-81	368	171	97	210	91
1981-82	479	203	104	337	126

SOURCE: Canadian Wheat Board Annual Report
(Canada Grains Council), Statistical Hand Book

TABLE 2: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED OILSEEDS AND VEGETABLE OILS (Percentages)

CROP YEAR	FLAXSEED	RAPESEED/ CANOLA	SOYABEANS
1961-62			
1962-63			
1963-64	422	312	26
1964-65	377	379	34
1965-66	473	322	35
1966-67	440	277	42
1967-68	254	284	41
1968-69	323	205	44
1969-70	361	261	32
1970-71	690	400	41
1971-72	365	459	41
1972-73	292	219	56
1973-74	530	239	56
1974-75	532	251	46
1975-76	510	362	51
1976-77	308	126	41
1977-78	499	237	76
1978-79	364	339	64
1979-80	477	271	60
1980-81	321	196	76
1981-82	426	162	63

SOURCE: Canada Grains Council Statistical Handbook
Statistics Canada, Oils and Fats, 32-006

TABLE 3: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED FRUITS (Fresh)[a/] (Percentages)

CALENDAR YEAR	ALL FRESH FRUIT	PLUMS AND PRUNES	RASP-BERRIES	STRAW-BERRIES	APPLES	APRICOTS	CHERRIES	GRAPES	PEACHES
1960		58		65	106	87	91	42	72
1961		61		55	115	85	93	34	80
1962		61		60	114	86	92	34	76
1963		68		60	118	56	94	38	75
1964		63		63	104	85	95	39	86
1965		55		59	110	1	90	33	59
1966		59		73	111	78	87	33	70
1967		53		74	116	79	93	36	74
1968		41		71	106	82	88	33	64
1969		40		63	112	1	82	36	59
1970		40	122	70	101	71	86	42	71
1971	48	45	122	70	99	69	84	40	73
1972	43	39	122	54	100	82	80	36	64
1973	42	43	136	54	102	77	69	34	59
1974	42	25	146	51	94	85	70	39	66
1975	45	40	125	58	100	82	80	38	69
1976	37	26	113	57	91	80	59	38	72
1977	38	25	140	58	93	79	75	34	73
1978	42	24	151	62	102	74	69	42	72
1979	39	25	150	62	91	75	69	34	60
1980	45	31	142	64	111	78	77	36	67
1981	36	19	146	61	81	71	62	37	52

a/ Ratio - production/sales to processors + waste + consumption

Source: Handbook of food expenditures, prices and consumption, Agriculture Canada
Apparent per capita food consumption in Canada, 32-226, 32-229, 32-230

TABLE 4: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED PROCESSED FRUIT (Percentages)

CALENDAR YEAR	ALL CANNED FRUIT	PEACHES CANNED	PEARS CANNED	ALL FROZEN FRUIT	STRAW-BERRIES FROZEN	ALL FRUIT JUICES	APPLE JUICE
1960		69	116		62		87
1961		81	87		62		133
1962		55	92		58		119
1963		54	78		53		114
1964		57	96		79		95
1965		34	65		27		136
1966		35	95		74		96
1967		20	67		53		106
1968		29	87		65		93
1969		26	70		34		102
1970		27	78		53		112
1971	51	27	73	85	48	27	97
1972	50	16	65	75	31	30	115
1973	55	20	63	81	30	21	85
1974	58	24	67	72	36	55	142
1975	60	19	68	61	17	24	93
1976	50	17	54	64	23	23	112
1977	43	14	60	92	30	28	103
1978	28	9	53	100	27	27	110
1979	31	12	61	85	23	27	108
1980	29	17	81	92	32	31	110
1981	29	10	61	115	42	28	106

Source: Handbook of Food Expenditures, Prices and Consumption; Agriculture Canada

TABLE 5: CANADA - SELF-SUFFICIENCY RATIOS[a] FOR SELECTED FRESH VEGETABLES (Percentages)

CALENDAR YEAR	ALL FRESH VEGETABLES[b]	RUTA-BAGAS	CABBAGE	ASPA-RAGUS	CAULI-FLOWER	CARROTS	LETTUCE	ONIONS	POTATOES	RADISHES	TOMATOES
1960			65	59	64	76		78	97	100	85
1961			65	54	61	91		71	108	100	83
1962		193	65	60	70	91		91	105	100	85
1963		170	69	57	74	92		102	108	100	80
1964		163	69	48	72	93		92	106	100	82
1965		157	69	45	76	85	21	103	109	100	84
1966		159	66	45	74	98	18	71	123	100	80
1967		183	63	40	73	85	19	78	93	21	81
1968		165	67	35	73	109	21	90	111	25	80
1969		197	65	39	76	93	17	71	100	21	75
1970		144	68	39	76	101	17	87	114	26	80
1971	80	182	67	38	74	92	22	81	100	29	81
1972	72	168	61	34	64	94	15	67	90	28	77
1973	73	166	63	38	69	96	18	75	98	41	78
1974	72	159	61	35	67	95	17	72	114	42	77
1975	58	161	66	32	66	105	16	68	94	43	78
1976	53	155	64	34	60	88	14	57	115	41	78
1977	71	163	72	35	60	89	15	69	105	32	80
1978	72	150	74	30	74	102	17	78	104	38	79
1979	73	151	79	30	71	104	17	71	104	38	78
1980	69	144	78	24	63	91	18	63	102	34	75
1981	72	149	80	23	59	101	16	72	115	14	79

[a] Ratios - production/manufacturing + water + consumption
[b] Excludes potatoes

Source: Handbook of Food Expenditures, Prices and Consumption; Agriculture Canada

TABLE 6: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED CANNED VEGETABLES[a] (Percentages)

CALENDAR YEAR	ALL CANNED VEGETABLES[c]	CANNED BEANS[b]	CANNED CARROTS	CANNED CORN	TOMATO JUICE
1960		92	135	98	104
1961		100	117	126	167
1962		105	89	114	106
1963		115	319	76	82
1964		150	90	110	112
1965		117	85	101	123
1966		141	105	110	71
1967		130	87	108	134
1968		123	86	122	98
1969		110	99	110	80
1970		132	75	131	92
1971	95	111	58	127	99
1972	79	89	72	113	109
1973	74	110	73	103	113
1974	81	106	79	91	86
1975	92	102	67	123	90
1976	82	85	58	146	117
1977	79	108	65	112	108
1978	74	108	83	95	110
1979	83	105	73	122	93
1980	80	101	62	116	81
1981	75	90	95	118	107

[a] Ratios - Production/Consumption

[b] Green and Wax

[c] Excludes tomato juice

Source: Apparent Per Capita Food Consumption, 32-226, 32-229, 32-230

TABLE 7: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED FROZEN VEGETABLES (Percentages)

CALENDAR YEAR	ALL FROZEN VEGETABLES	FROZEN CORN	FROZEN PEAS
1960		137	100
1961		116	100
1962		127	125
1963		98	106
1964		89	129
1965		108	126
1966		124	110
1967		180	114
1968		94	120
1969		169	105
1970		146	109
1971	86	135	82
1972	99	172	96
1973	108	169	104
1974	102	211	119
1975	114	362	124
1976	92	339	96
1977	112	165	127
1978	117	162	117
1979	123	161	131
1980	92	179	86
1981	103	171	110

Source: Apparent Per Capita Food Consumption, 32-226, 32-229, 32-230

TABLE 8: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED MEATS (percentages)

CALENDAR YEAR	BEEF	PORK	MUTTON AND LAMB
1960	100	101	59
1961	101	101	53
1962	99	101	44
1963	100	97	41
1964	101	100	45
1965	105	102	51
1966	103	103	27
1967	100	103	24
1968	102	101	18
1969	97	99	16
1970	97	104	17
1971	97	106	25
1972	95	104	18
1973	94	107	25
1974	94	101	30
1975	94	99	25
1976	94	92	34
1977	96	92	29
1978	95	101	22
1979	97	107	17
1980	99	113	24
1981	99	115	36
1982	99	121	43

Source: Handbook of Food Expenditures, Prices and Consumption, Agriculture Canada

TABLE 9: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED POULTRY MEAT (percentages)

CALENDAR YEAR	TURKEY MEAT	CHICKEN MEAT	TOTAL POULTRY MEAT*
1960	94		95
1961	103		102
1962	103		103
1963	93	101	99
1964	97	100	98
1965	101	100	99
1966	103	101	100
1967	98	99	98
1968	99	100	98
1969	97	100	99
1970	105	102	102
1971	101	100	100
1972	93	101	99
1973	102	101	101
1974	102	101	101
1975	88	95	93
1976	97	96	96
1977	98	92	94
1978	93	94	94
1979	105	96	98
1980	97	94	95
1981	94	96	96
1982			

*Includes chicken, fowl, turkey, goose and duck.

Source: Handbook of Food Expenditures, Prices and Consumption, Agriculture Canada

TABLE 10: CANADA - SELF-SUFFICIENCY RATIOS FOR SELECTED DAIRY PRODUCTS (percentages)

CALENDAR YEAR	MILK ALL PURPOSES	WHOLE MILK CHEESE	SKIM MILK POWDER	CREAMERY BUTTER*	CHEDDAR CHEESE	OTHER CHEESE **
1960			139	111	185	51
1961			139	122	188	46
1962			145	113	175	48
1963			116	101	178	49
1964			131	99	177	53
1965			160	94	182	57
1966			162	96	196	64
1967			227	98	190	59
1968			223	101	200	58
1969			187	109	178	60
1970	99	95	273	100	158	71
1971	95	103	280	90	158	69
1972	97	99	332	99	155	70
1973	94	90	269	86	141	65
1974	92	89	236	88	138	70
1975	98	86	297	110	138	68
1976	98	85	245	97	133	72
1977	104	91	194	106	138	76
1978	100	91	130	97	135	78
1979	103	93	219	93	137	82
1980	103	97	254	94	146	81
1981	103	92	280	105	143	81
1982		90				

* Includes butter oil as butter equivalent
** Does not include process cheese

Source: Handbook of Food Expenditures, Prices and Consumption, Agriculture Canada

FIGURE 1

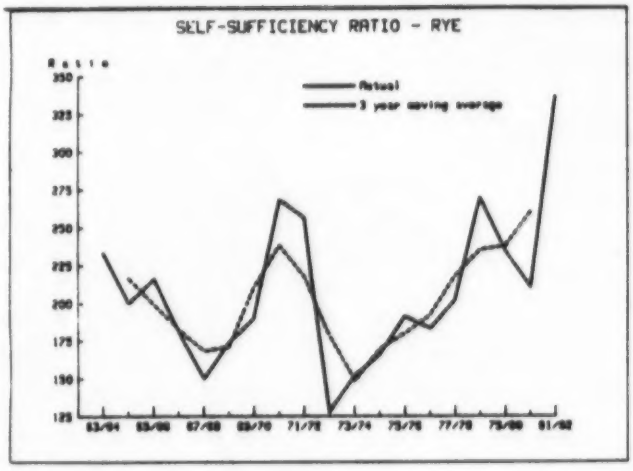
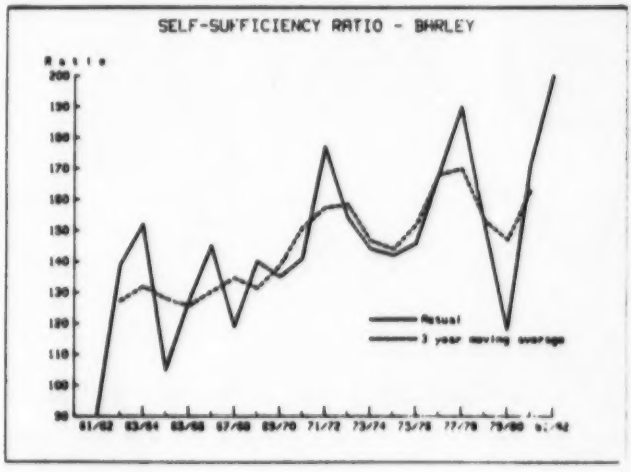


FIGURE 2



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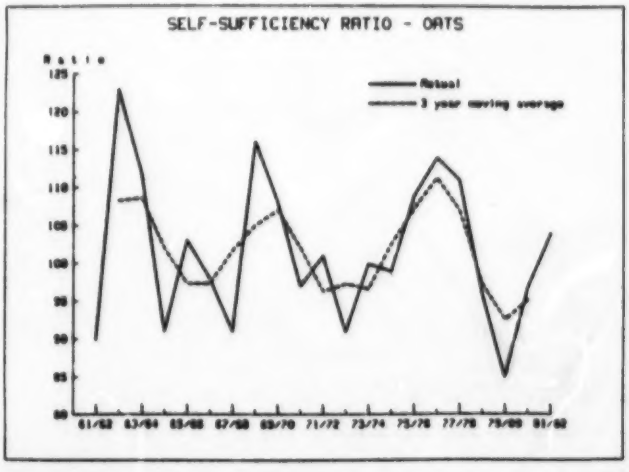

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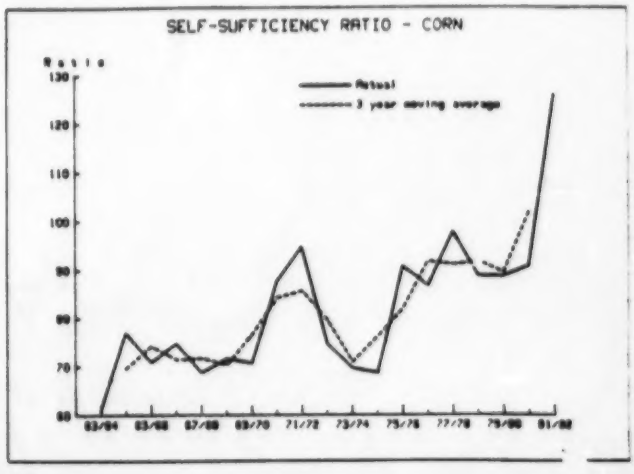

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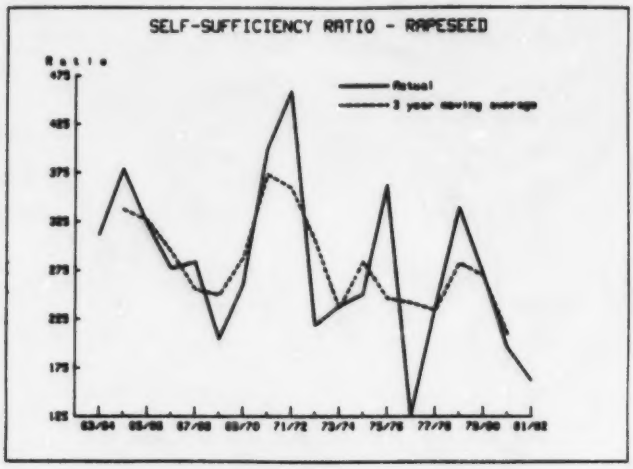

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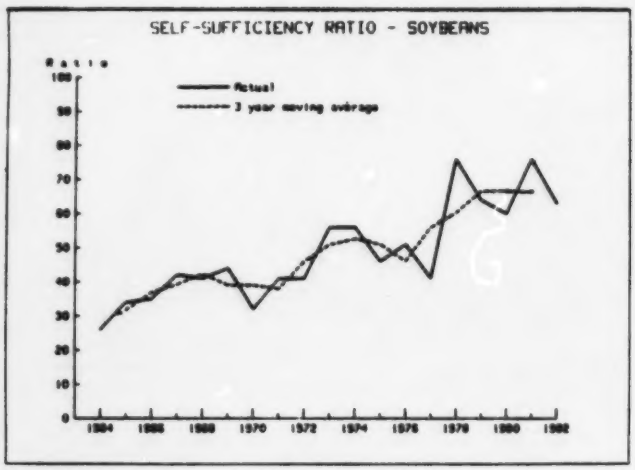

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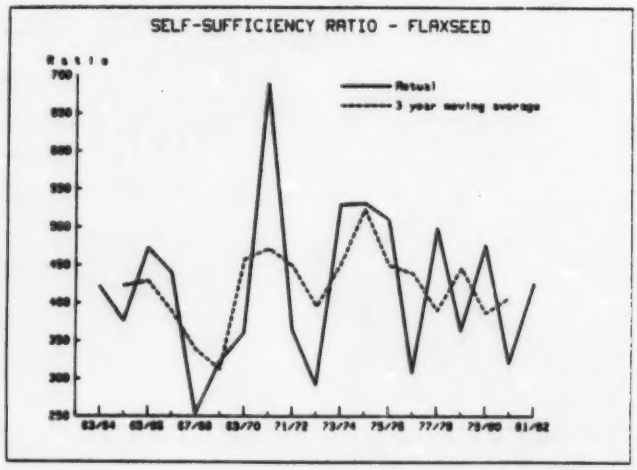

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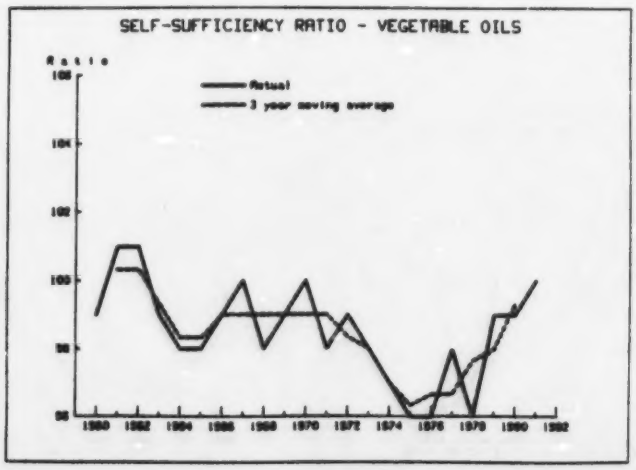

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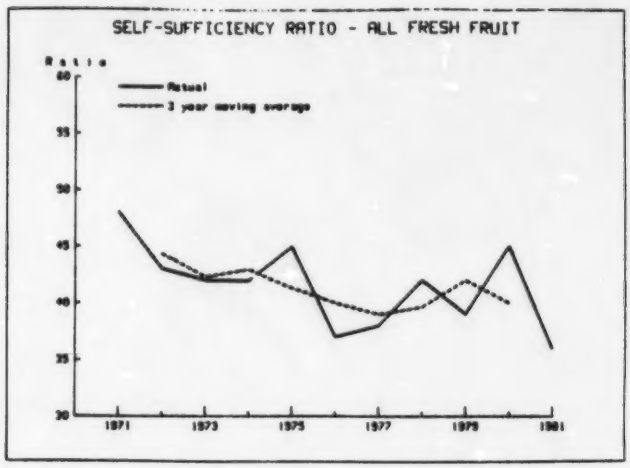
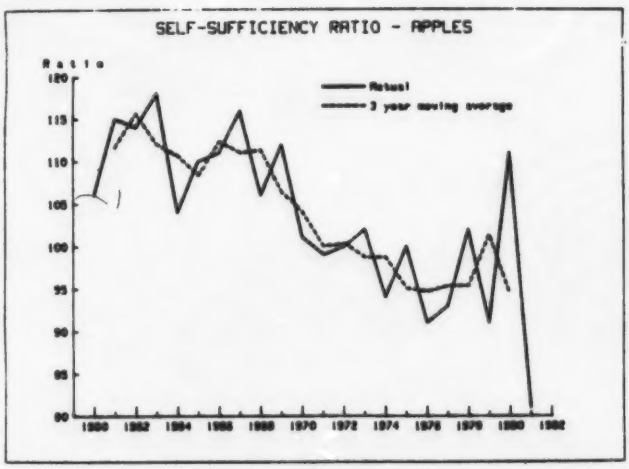


FIGURE 10



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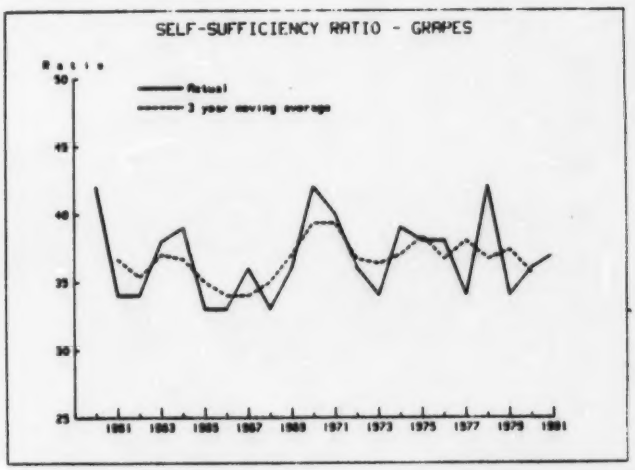

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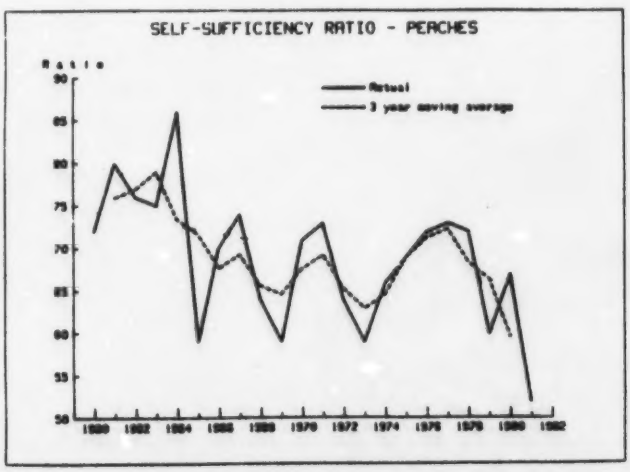

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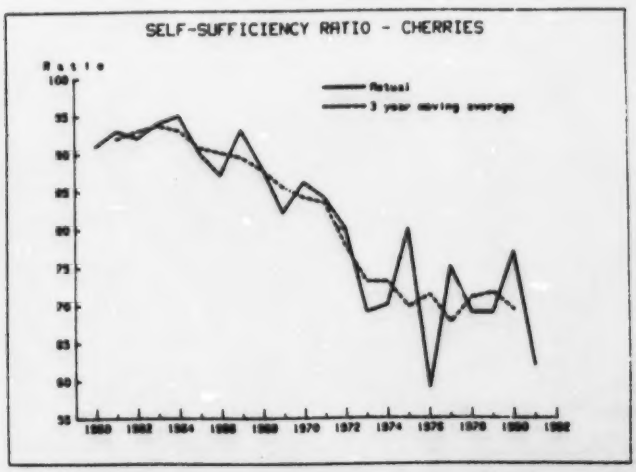

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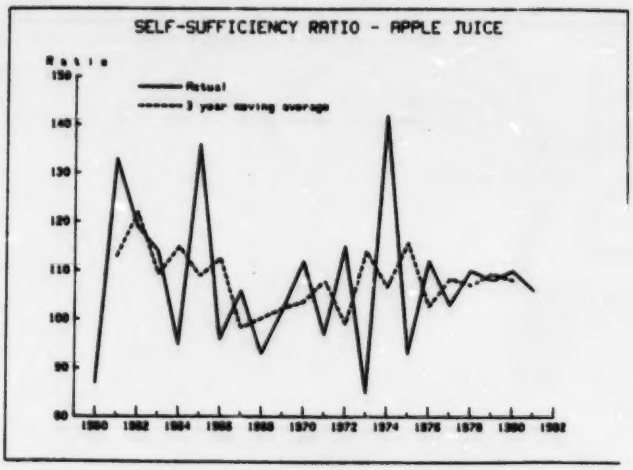

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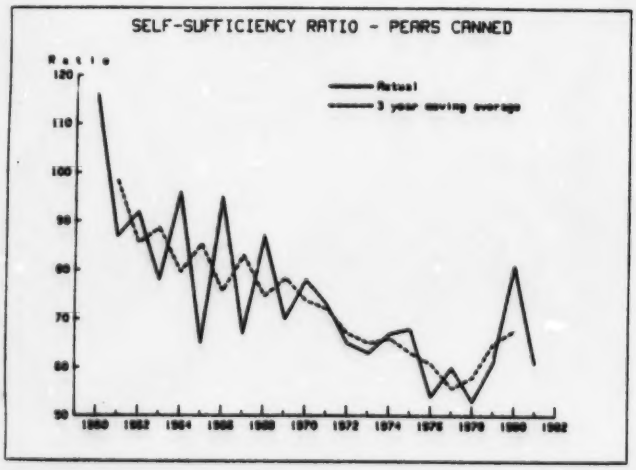

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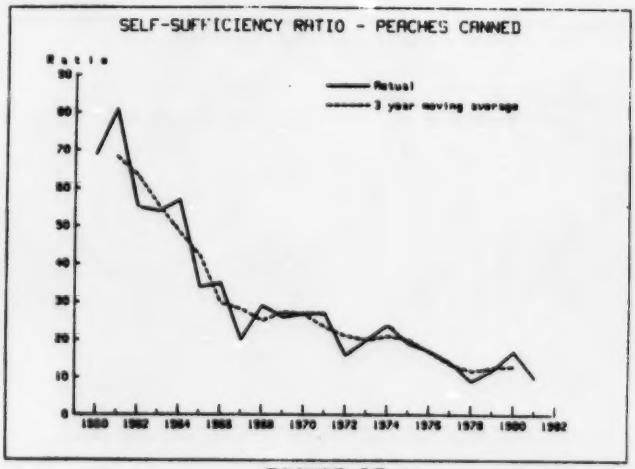

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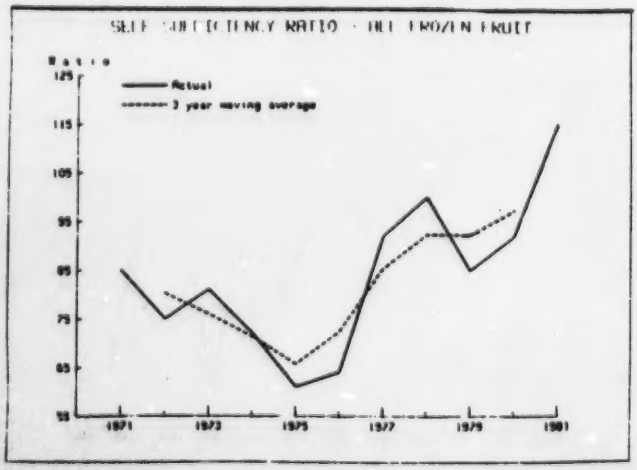

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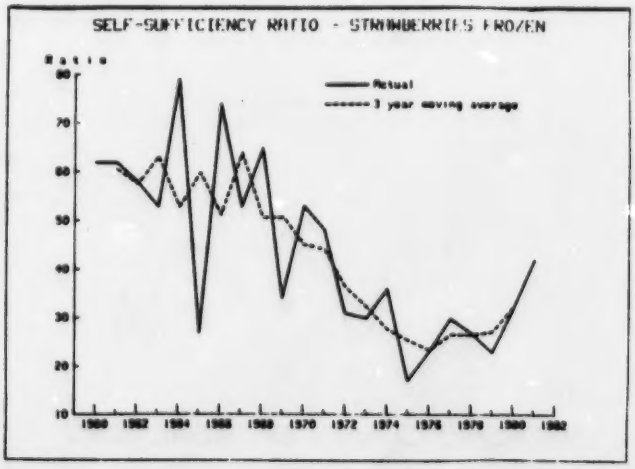

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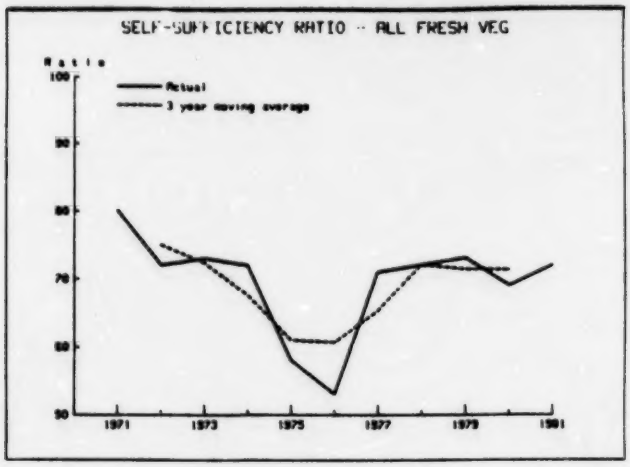

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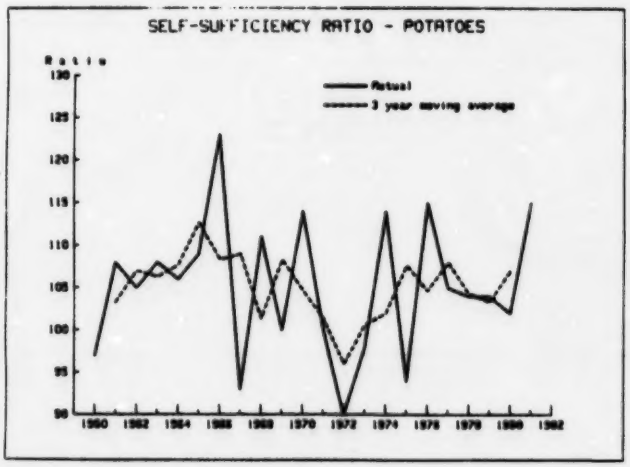

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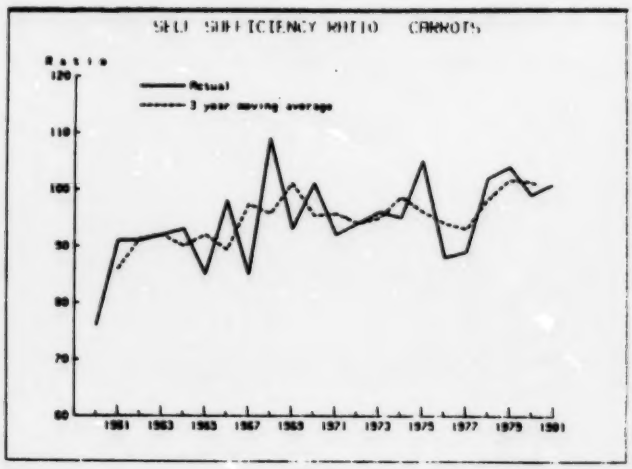

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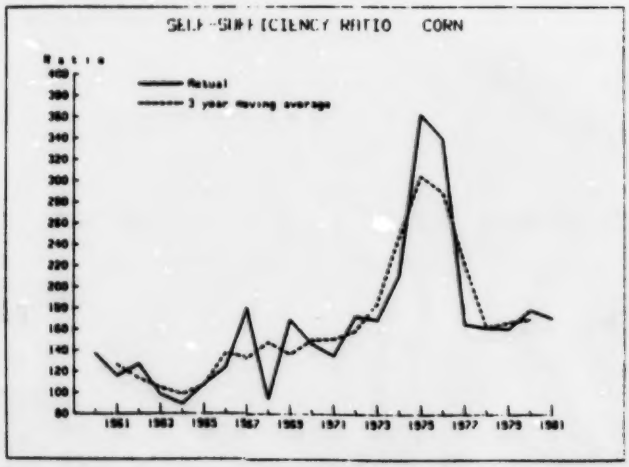

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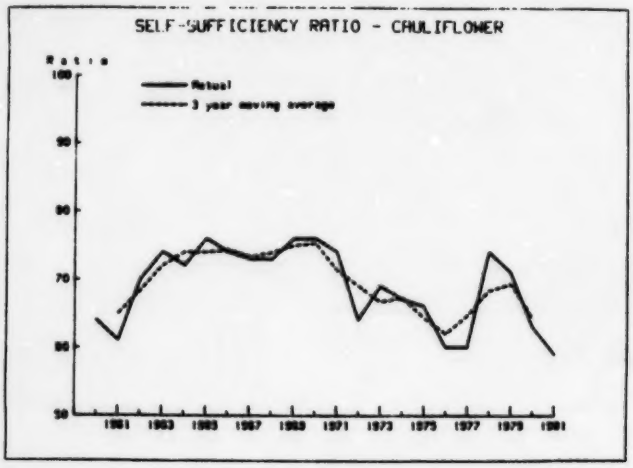

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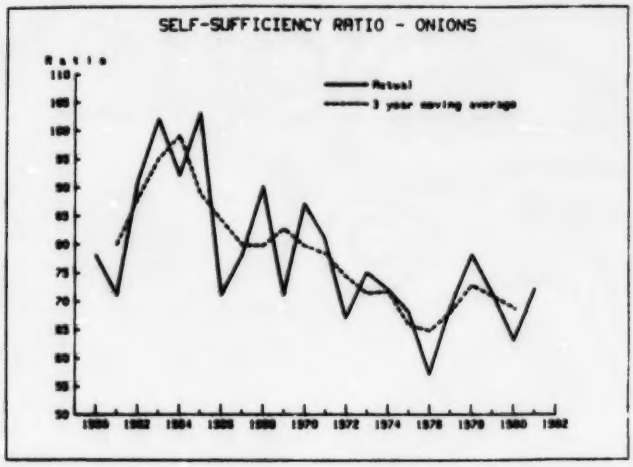

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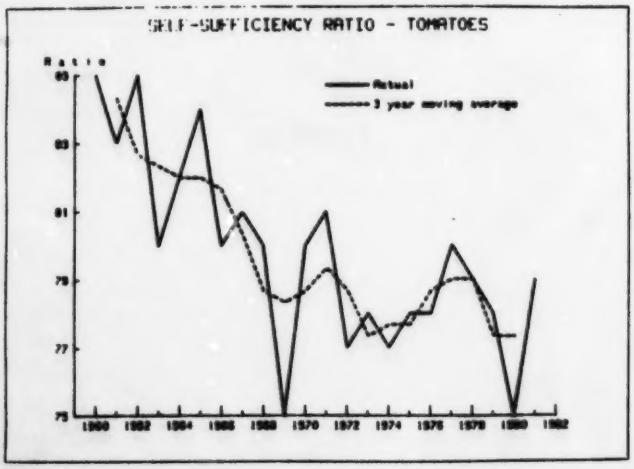


FIGURE 26

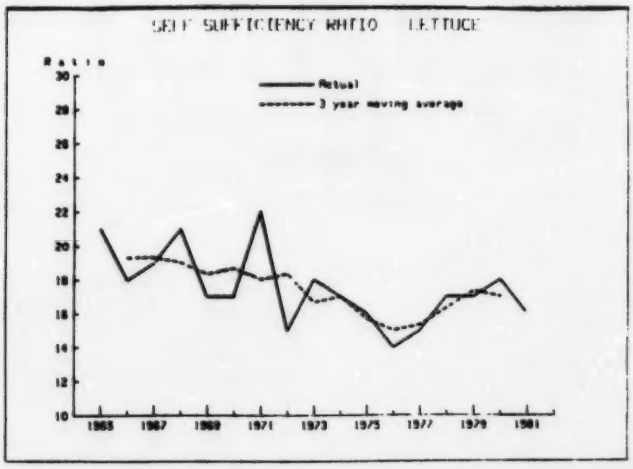


FIGURE 27

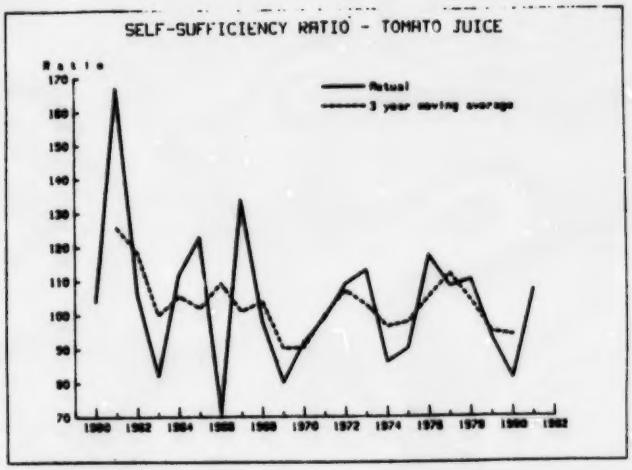


FIGURE 28

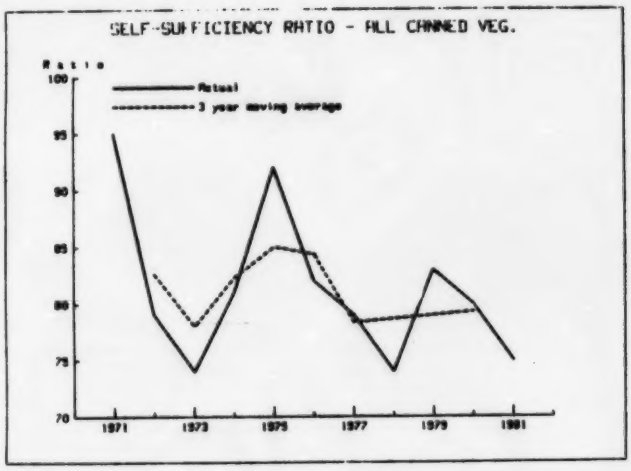


FIGURE 29

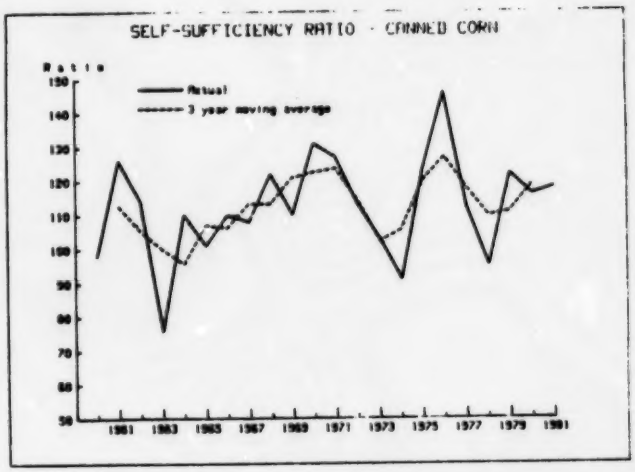


FIGURE 30

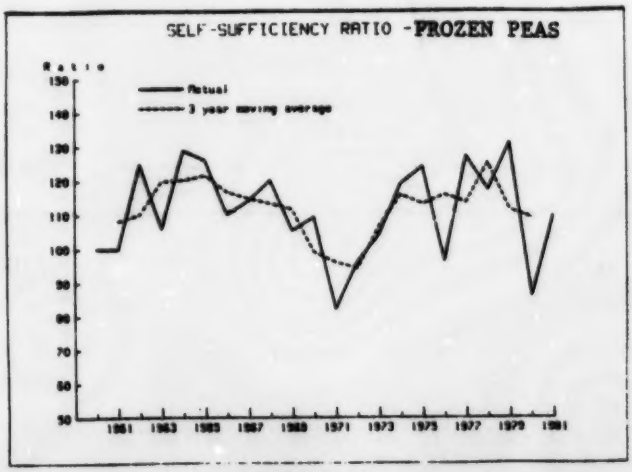


FIGURE 31

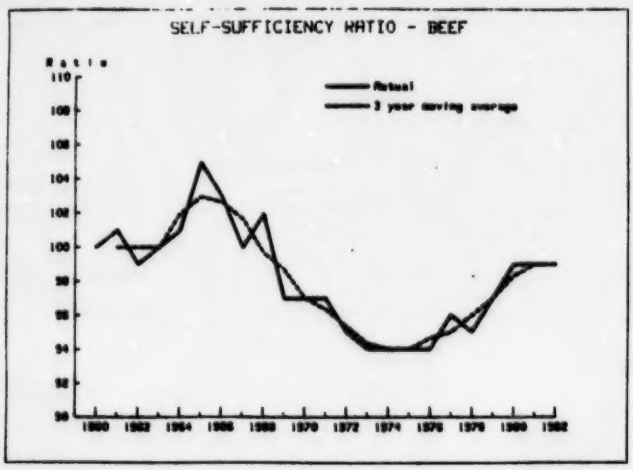


FIGURE 32

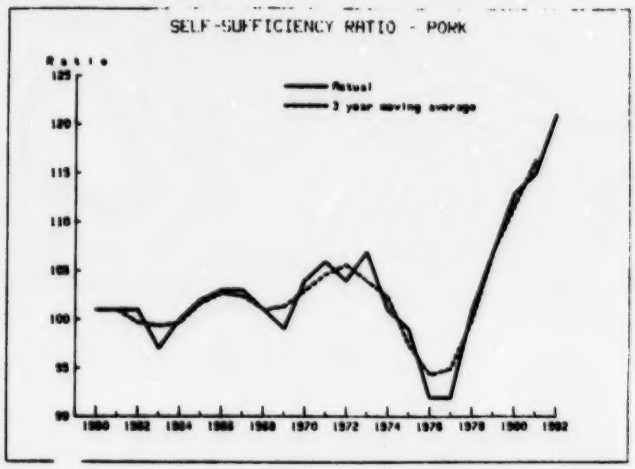


FIGURE 33

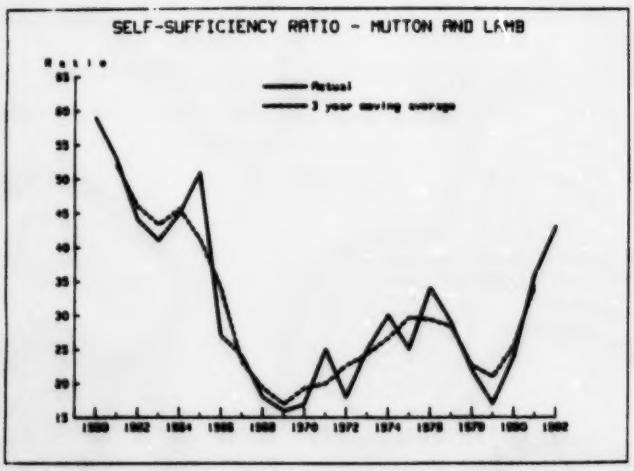


FIGURE 34

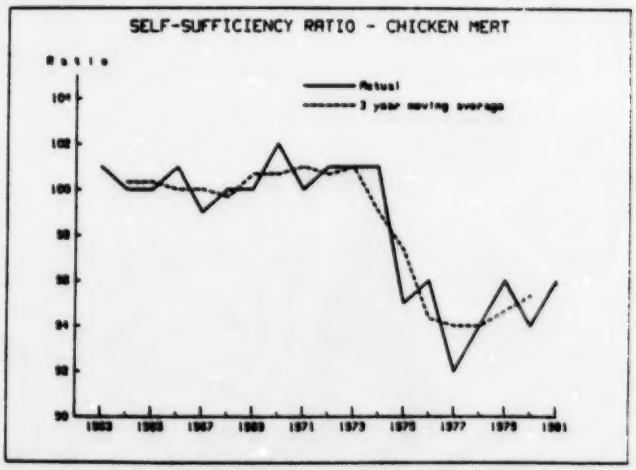
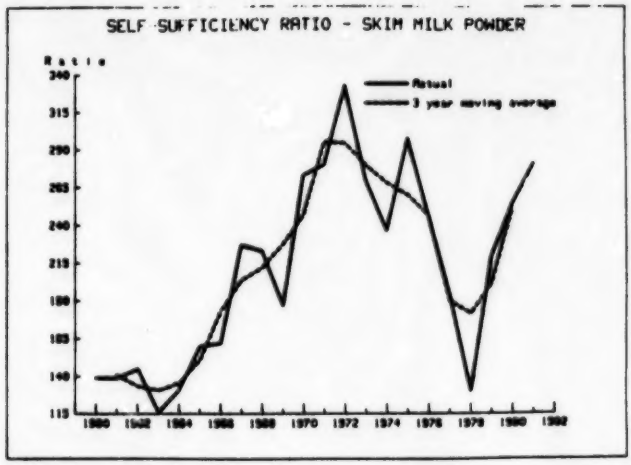


FIGURE 35



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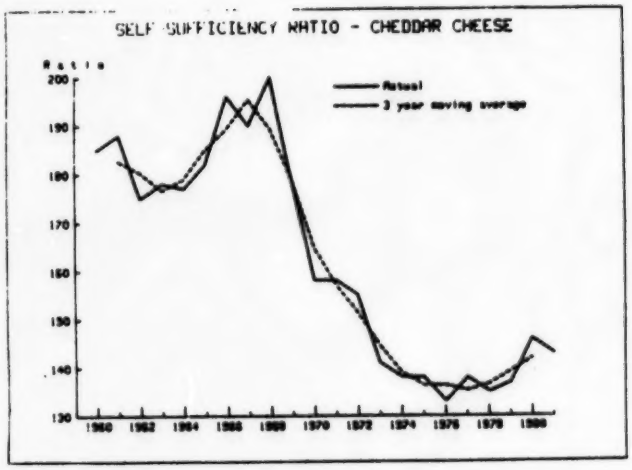

FIGURE 37

FIGURE 38

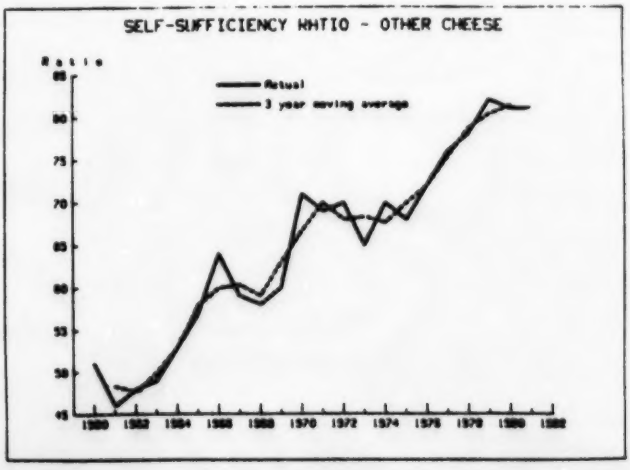

FIGURE 39

LIST OF WORKING PAPERS PUBLISHED IN 1985

No. 1 The Food Marketing Cost Index. O. Al-Zand, S. Barewal and G. Hewston. January 1985.

No. 2 The Parameters of Consumer Food Demand in Canada. S. Barewal and D. Goddard. January 1985.

No. 3 Canadian Greenhouse Vegetable Industry. Robert W. Anderson. February 1985.

No. 4 Alternative Pork Carcass Evaluation Procedures in Reference to the Canadian Index 100 System. Terrance P. Chabluk and Norman J. Beaton. February 1985.

No. 5 Self-Sufficiency Trends in Canadian Agriculture: 1960-1980 and Future Prospects. International Trade Policy Division. March 1985.

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